

### C. Remarks

The claims are 4, 5, 9, and 16, with claims 4 and 5 being independent. The independent claims have been amended to further clarify the invention. Support for this amendment may be found in the specification at page 63, line 27, to page 64, line 23, and in the Table on page 69. No new matter has been added. Reconsideration of the claims is respectfully requested.

Claims 4, 5, 9, and 16 stand rejected under 35 U.S.C. § 103(a) as being allegedly obvious from U.S. Patent Application Publication No. 2004/0070643 A1 (Kubota) in view of U.S. Patent No. 6,461,798 (Ohkuma). These claims also stand rejected under the judicially created doctrine of obviousness-type double patenting over the claims that issued in Kubota (U.S. Patent No. 6,951,380 B2) in view of Ohkuma. The grounds of rejection are respectfully traversed.

Prior to addressing the merits of rejection, Applicants would like to briefly review some of the features and advantages of the presently claimed invention. That invention, in pertinent part, is related to a method for manufacturing a liquid discharge head with a liquid passage. This method includes a step of providing a first polymethyl isopropenyl ketone (PMIPK) layer, and a step of providing, on the first layer, a second layer including a photosensitive material of a copolymer obtained by copolymerization of a methacrylate and a methacrylic acid or anhydride (PMMA). The desired pattern from the second layer is formed by exposing a part of the second layer and removing the exposed part using a developing solution. The desired pattern from the first layer is formed by exposing a part of the first layer and removing the exposed part using a developing

solution. Then, a coating layer is provided to coat the mold, and the mold is finally removed to form the liquid passage.

Furthermore, the first layer has a thickness of not less than 15  $\mu\text{m}$  and the second layer has a thickness from 5  $\mu\text{m}$  to 10  $\mu\text{m}$ . As a result, it is possible to prevent cracking of the PMMA layer and to precisely form the flow path mold for the liquid discharge head. This is further supported by the data presented in the Table at page 69 of the specification, which is discussed below in more detail.

Kubota is related to a method of manufacturing a microstructure and a liquid discharge head. Kubota, however, discloses forming PMIPK and PMMA layers in the opposite arrangement from that presently claimed. Moreover, Kubota does not disclose or suggest the thickness of the layers as claimed.

Ohkuma cannot cure the deficiencies of Kubota. Ohkuma teaches forming a mold for a flow path from a single PMIPK layer, rather than a combination of PMIPK and PMMA layers as in the present invention or in Kubota. The acrylate coating in Ohkuma forms the wall of the liquid passage in the liquid ejection head. It is not a part of the mold, which is removed at the end of the process to form a liquid passage, and represents a component corresponding to item 34 in Fig. 2C of Kubota.

The Examiner has alleged that one skilled in the art would want to at least try using the PMIPK layer in Kubota as the first layer, because Ohkuma discloses that the PMIPK layer forms a highly precise device. However, even if assumed, *arguendo*, that Ohkuma does teach that the PMIPK layer forms a highly precise device, this reference does not disclose or suggest why the PMIPK layer that is already used in Kubota should now be the first layer rather than the second layer (i.e., how the purported advantages mentioned in

Ohkuma make PMIPK more suitable as the first layer in the structure of Kubota), much less that PMIPK is any better than PMMA if used as the first layer. Thus, it is not at all clear how one skilled in the art would be motivated by Ohkuma to reverse the layers in Kubota.

Furthermore, the cited references fail to show the problem of cracking if the layers are arranged as in Kubota and when the thickness of the PMMA layer increases. As recognized in the 2010 KSR Guidelines Update, if a problem solved by an applicant was not known in the art, the claims directed to the solution may be non-obvious. 75 *Fed. Reg.* 53643, 53646 (2010); see *In re Omeprazole Patent Litigation*, 536 F.3d 1361 (Fed. Cir. 2008). Specifically, the Guidelines indicate that even when the individual claimed elements are known and there is no evidence of undue technical hurdles or lack of a reasonable expectation of success, the combination may nonetheless be nonobvious, because the flaws in the prior art structures that had prompted the modification had not been recognized – there would have been no reason to modify the initial structure, even though the modification could have been done. *Id.* In the instant application, the problem with cracking, for example, is mentioned in the specification at page 5, and is not recognized by the cited art.

Furthermore, as previously discussed by Applicants, the data provided in the present application in the Examples and the Comparative Examples demonstrates that forming the layers as presently claimed provides unexpectedly superior results. As is apparent from the data in the Table (page 69), in the ink-jet heads manufactured in accordance the present invention, no film reduction, cracking, or residue was found in the mold material, and both the nozzle yield and the printing yield were preferable. However,

in Comparative Examples 1 and 3, where the layers were reversed, a reduction in sensitivity and cracking, as well as residue, were observed. Also, in terms of both the nozzle yield and the printing yield, the nozzles in the Comparative Examples were poorer than those manufactured in accordance with the present invention.

The Examiner, on page 6 of the Office Action, appears to dismiss the above unexpectedly superior results by arguing that the claims are *prima facie* obvious.

Applicants submit, however, that this not sufficient, because more than mere *prima facie* obviousness must now be shown. That is, once evidence of unexpectedly superior results has been presented to rebut *prima facie* obviousness, the burden shifts to the Office to show why these results are not unexpectedly superior, and a mere reference to *prima facie* obviousness factors in this case does not show that these results are not unexpectedly superior.

The double patenting rejection is based on a substantially the same premise as the above-discussed obviousness rejection. Therefore, Applicants respectfully submit that it cannot be maintained at least for the same reasons as those discussed above with respect to the obviousness rejection.

Wherefore, withdrawal of the outstanding rejections and passage of the application to issue are respectfully requested.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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